

MMA-054025-M4 500 - 4000 MHz Fully Matched High Dynamic Range Amplifier

Features:

- Frequency Range: 500 – 4000 MHz
- OIP3: +44 dBm
- P1dB: +25 dBm
- Gain @ 500 - 4000 MHz : 11 dB
- 3 dB NF @ 900 - 2700 MHz
- Single +7.5 V Supply
- MTTF > 100 years @ 85 °C ambient temperature
- Lead Free RoHS Compliant Surface-Mount QFN 4 x 4 mm Package

Applications:

- Cellular/PCS/3G Base Stations
- Fixed Wireless and WLAN
- Point-to-Point Radio

Description:

The MMA-054025-M4 is a high linearity broadband MMIC amplifier. Packaged in low cost QFN 4 x 4 mm lead-free Green Package, the MMIC is ideally suited for high linearity driver and high dynamic range LNA applications. The applications include 2G, 2.5G, and 3G wireless infrastructure standards, such as GSM, TDMA, CDMA, EDGE, CDMA2000, WCDMA, TD-SCDMA, and UMTS base stations. The third order intercept point performance is excellent, typically 18 dB above the 1 dB gain compression point.

MMA-054025-M4 provides +25 dBm P1dB, +44 dBm output IP3, and 11 dB gain with 3 dB noise figure.

Electrical Specifications: $V_{ds} = 7.5\text{ V}$, $I_{ds} = 300\text{ mA}$, $T_a = 25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$

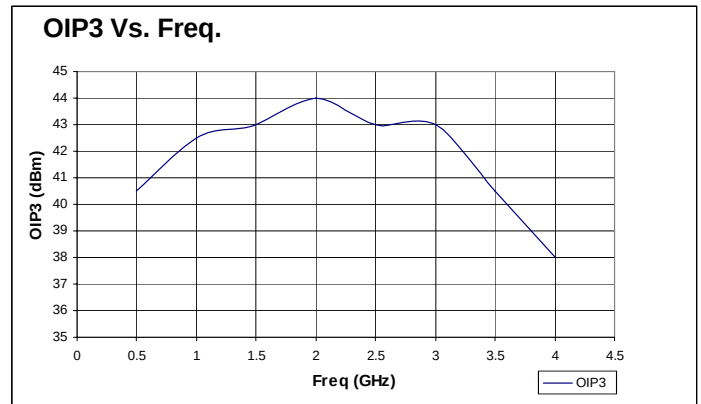
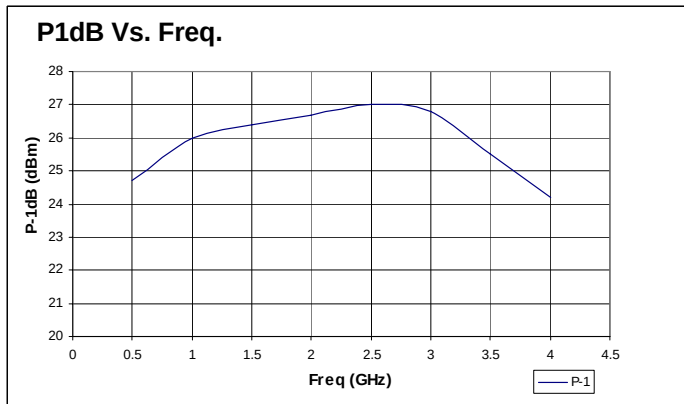
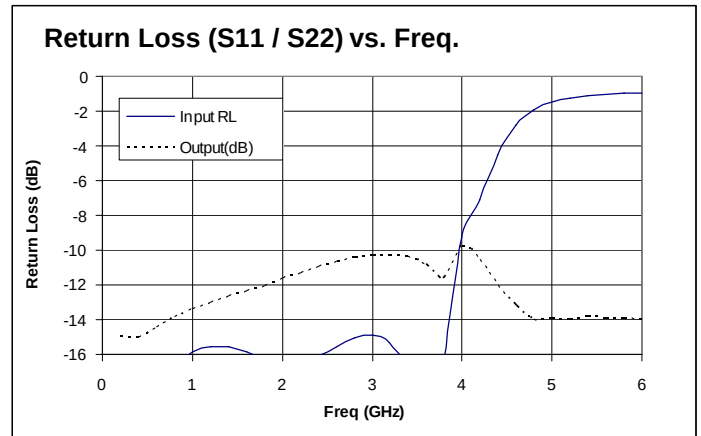
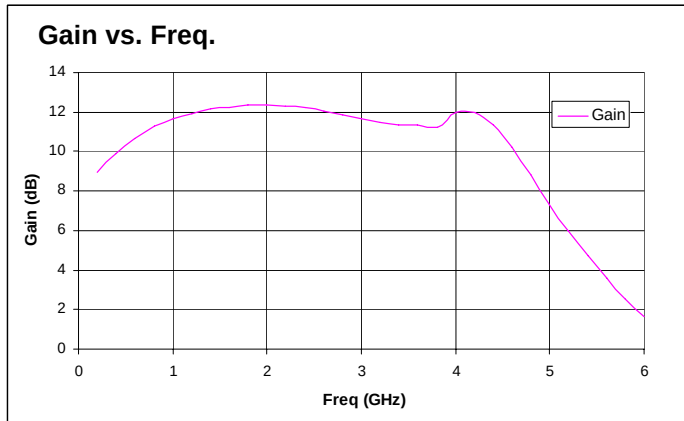
Parameter	Units	Typical Data
Frequency Range	MHz	500 - 4000
Gain (Typ / Min)	dB	11
Gain Flatness (Typ / Min)	±dB	1.0
Input Return Loss (Typ)	dB	10
Output Return Loss (Typ)	dB	10
Output P1dB (Typ)	dBm	25
Output IP3 (Typ / Min) ⁽¹⁾	dBm	44
Noise Figure	dB	3.5
Operating Current Range (Min / Max)	mA	300 / 350
Thermal Resistance (Typ)	°C / W	25

(1) Output IP3 is measured with two tones at output power of 11 dBm / tone separated by 10 MHz

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Typical RF Performance: $V_{ds} = 7.5\text{ V}$, $I_{ds} = 300\text{ mA}$, $T_a = 25\text{ }^{\circ}\text{C}$, $50\text{ }\Omega$ system



ESD Caution



High-performance RF integrated circuits are highly sensitive to electrostatic discharge (ESD) and may contain unprotected inputs and outputs. Handling and assembly should be conducted in an ESD-controlled environment. It is recommended that ESD precautions and protocols are adopted to minimise the risk of electrostatic discharge and protect product integrity.

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Typical Scattering Parameters: $V_{ds} = 7.5\text{ V}$, $I_{ds} = 300\text{ mA}$, $T_a = 25\text{ }^{\circ}\text{C}$, Reference Planes at Leads

Freq (GHz)	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
0.2	0.06	12.2	2.80	175.8	0.006	71.4	0.18	-93.0
0.4	0.10	-0.3	3.12	160.2	0.011	48.5	0.18	-125.8
0.6	0.13	-21.9	3.42	142.5	0.016	29.2	0.19	-150.4
0.8	0.15	-45.6	3.65	123.5	0.019	13.1	0.20	-170.6
1.0	0.16	-69.9	3.82	104.7	0.023	-2.4	0.21	171.6
1.2	0.17	-95.3	3.95	85.3	0.027	-18.6	0.22	156.2
1.4	0.17	-122.1	4.05	66.3	0.030	-34.2	0.23	141.1
1.6	0.16	-151.0	4.09	47.0	0.034	-50.3	0.24	126.1
1.8	0.15	178.4	4.14	27.7	0.037	-66.5	0.25	112.0
2.0	0.15	144.9	4.15	8.3	0.040	-82.7	0.26	96.8
2.2	0.15	110.3	4.13	-11.2	0.043	-99.3	0.27	82.0
2.4	0.16	75.5	4.08	-30.6	0.046	-115.9	0.28	66.0
2.6	0.17	43.1	4.01	-49.6	0.048	-131.9	0.29	50.4
2.8	0.18	13.0	3.92	-68.5	0.050	-147.8	0.30	34.3
3.0	0.18	-13.5	3.83	-87.0	0.053	-163.0	0.30	18.6
3.2	0.17	-37.7	3.75	-105.1	0.056	-178.3	0.31	2.4
3.4	0.14	-56.1	3.71	-123.1	0.059	167.7	0.30	-12.8
3.6	0.09	-55.6	3.69	-141.7	0.067	154.6	0.29	-28.4
3.8	0.15	-3.6	3.65	-159.6	0.091	137.7	0.26	-36.5
4.0	0.35	-41.5	3.97	-179.7	0.101	94.4	0.33	-50.3
4.2	0.44	-63.4	3.96	154.3	0.085	69.8	0.30	-72.4
4.4	0.59	-87.7	3.70	128.6	0.078	48.0	0.25	-86.7
4.6	0.72	-115.7	3.24	104.2	0.069	26.2	0.22	-94.4
4.8	0.80	-143.4	2.76	82.6	0.060	5.5	0.20	-99.5
5.0	0.85	-168.5	2.33	63.7	0.052	-12.0	0.20	-105.4
5.2	0.87	168.1	1.99	46.4	0.045	-28.7	0.20	-113.3
5.4	0.88	147.4	1.72	30.8	0.040	-43.0	0.20	-122.7
5.6	0.89	127.6	1.52	15.7	0.036	-57.4	0.20	-132.8
5.8	0.89	109.7	1.34	0.9	0.033	-71.0	0.20	-144.0
6.0	0.90	92.8	1.21	-13.4	0.030	-84.2	0.20	-154.8

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Absolute Maximum Ratings: $T_a = 25\text{ }^{\circ}\text{C}^*$

SYMBOL	PARAMETERS	UNITS	ABSOLUTE MAXIMUM
Vds	Drain-Source Voltage	V	8.5
Ids	Drain Current	mA	400
Igs	Gate Current	mA	3
Pdiss	DC Power Dissipation RF	W	3.2
Pin max	Input Power	dBm	+24
Toper	Operating Temperature	$^{\circ}\text{C}$	-40 to +85
Tch	Channel Temperature	$^{\circ}\text{C}$	150
Tstg	Storage Temperature	$^{\circ}\text{C}$	-60 to 150

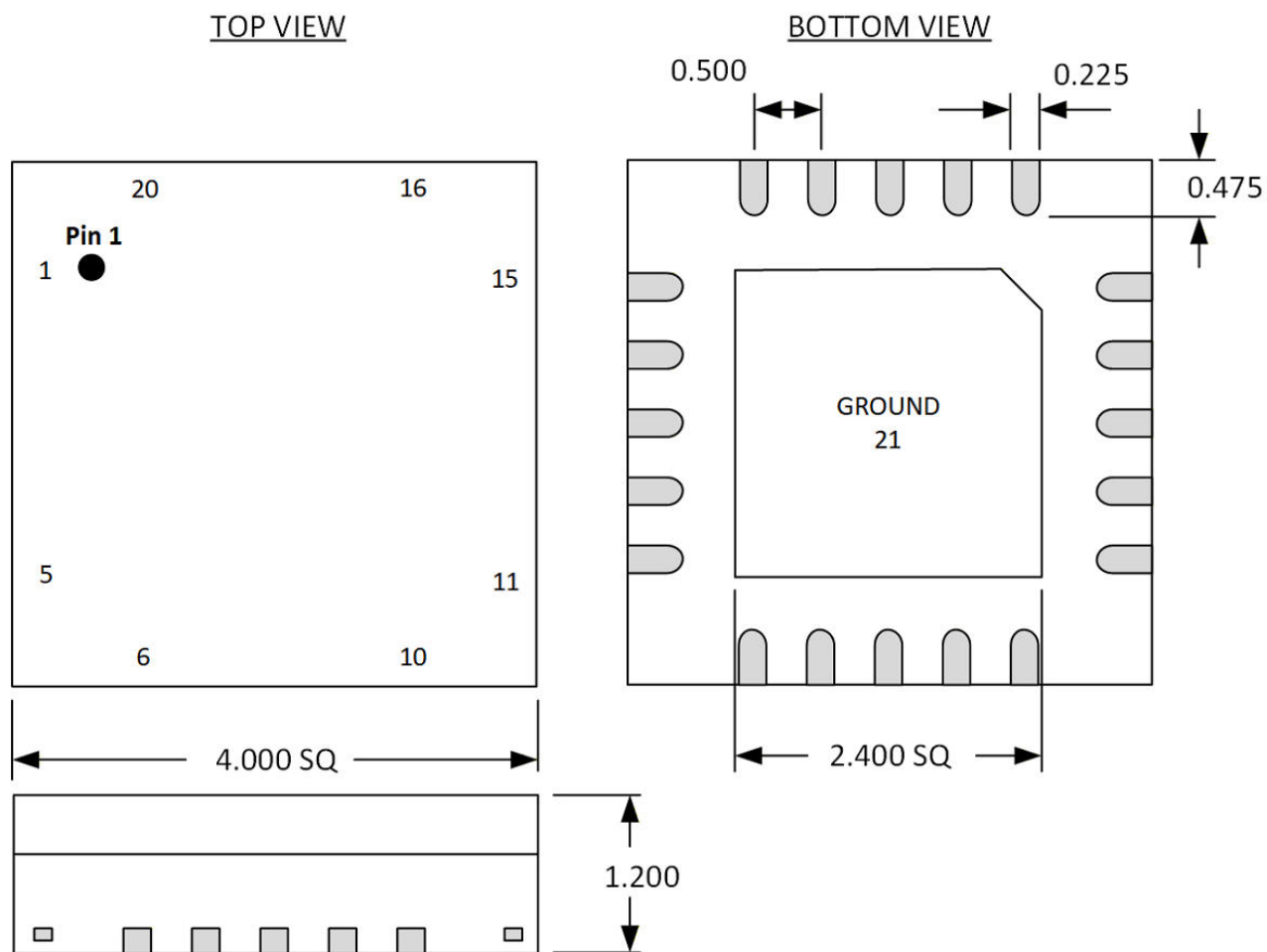
*Operation of this device above any one of these parameters may cause permanent damage.

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Mechanical Information:

This Package is RoHS-compliant lead free Green Package



The units are in [mm].

Pin	Description
3	RF Input
13	RF Output / DC Input
2, 4, 12, 14, 21	GND
1, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20	Floating

RoHS Compliance



CML Micro certifies, to the best of our knowledge, that its products comply with RoHS directive (2011/65/EU), as amended by Directive (EU) 2015/863.

REACH Compliance



CML Micro certifies, to the best of our knowledge, that its products do not contain any of the banned substances specified in the SVHC list at <https://echa.europa.eu/candidate-list-table>. CML Micro are committed to ensuring the safety of products and the compliance with regulations. Publications will be updated in the event that REACH control is compromised.

Contact Information

For further information please contact your local CML sales representative.
Contact details can be found at www.cmlmicro.com.

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